User's Guide

LA5034

Operation Manual



Content

General Safety Summary

Please understand the following safety precautions to avoid injuries and damages to the product or any equipment connected. To be away from possible dangers, please be sure to follow the regulations.

- **Only qualified persons are allowed to do the maintenance**.
- **Prevent from fire and any personal damage.**
- **Use Proper Power Cord.** Use the power cord authorized in your country only.
- **Correctly Plug in and Pull out.** When the probes or the test leads are connecting to the voltage source, please do not plug in or pull out.
- **Ground the product.** This product is grounded through the grounding conductor of the power cord. To avoid electric shocks, the grounding conductors must be grounded properly before making connections to the input or output terminals of the instrument.
- **Correctly connect probe.** The probes' ground terminals are at the same voltage level of the product ground. Do not connect the ground terminals to a high voltage.
- **Check the ratings of all terminals.** To avoid fire or shock hazard, check all ratings and marks on the product. Follow the user's guide for detailed rating information before making connections to the product.
- **Do not operate the product when the case or panel is removed.**
- **Avoid Circuit Exposure.** Do not touch exposed connections and components when power is on.
- **If you think the product is broken, do not operate.** If you think that this product has something wrong, please let qualified service persons to check it.
- **Keep proper ventilation.**
- **Do not operate in wet/damp environment.**
- **Do not operate in flammable and explosive air.**
- **Please keep the product surface clean and dry.**

Introduction

The LA5034 is a 500MHz, 34-channel logic analyzer for test, diagnostics, and analysis of digital signals in digital circuits. It has the features of the multi-channel oscilloscopes and other expensive bench type instruments. The adoption of advanced large-scale integrated circuits, the integrated USB 2.0, CPLD, FPGA, the high-frequency digital circuit, the embedded systems, and the other advanced technologies, make the LA5034 portable, easy-to-use and good for extension. It is your best choice in pc-based logic analyzers. The LA5034 is very suitable for electronics engineers and college students in scientific research and development.

The User's Manual describes in details the operation of the LA5034 as well as the installation of the software.

1. The LA5034 has a sufficient number of input channels. It is capable of simultaneously observing multi-channels of data flow information or control information, and capture narrow pulse interferences in some way.
2. The LA5034 has delay function to capture the waveforms prior to and behind the required observation points and has the variety of functions to capture digital information.
3. The LA5034 has adequate memory capacity to find occasional error messages and the malfunction reasons from the status kept in memory.
4. The LA5034 has intuitive and flexible display modes to facilitate dynamic analysis. The information can be transformed, and the user can use the binary, decimal, hexadecimal or ASCII code to display the information to facilitate the modification and debugging on software.
5. The LA5034 has a variety of trigger modes. It can locate precisely the information observed in a very long data stream, in order to capture the useful information for analysis. In analysis on software, it can track the running software with its trigger function. In analysis on hardware, the trigger function can detect and display the interferences and the burrs in the system.
6. The LA5034 has reliable burr-detection ability. Because of the factors of the competition phenomenon in digital circuit, the crosstalk between signals, the external interferences and the power coupling, the signals are often mixed with irregular burrs, which will make the circuit run with errors. The LA5034 can detect and display the burrs by its special burr detection technology.

Chapter 1 Getting started

This chapter focuses on the following topics:

- System Requirement
- Install hardware
- Install software
- Understanding of the user interface

System Requirements

- **Minimum System Requirements**
  Operating System
  Windows me/NT/2000/XP/Vista

  Memory
  128MB

  Graphic Card
  Microsoft DirectX supported
  Screen resolution: 1024x768
  Color depth: 16bit

- **Recommended System Requirements**
  Operating System
  Windows me/NT/2000/XP/Vista

  Memory
  256MB

  Graphic Card
  Microsoft DirectX supported
  Screen resolution: 1024x768
  Color depth: 16bit

Install Hardware

1. Connect the A-Type Plug of USB cable to your PC's USB port.
2. Connect the B-Type Plug of USB cable to LA5034's USB port.
3. New hardware is found.



4. New hardware search wizard starts.



5. New hardware search wizard starts to search



6. New hardware wizard installs driver



7. Finish new hardware search wizard.



Caution:

Do not disconnect any device from the USB bus while the computer is communicating with the LA5034, or you may lose data and/or your ability to communicate with the LA5034.

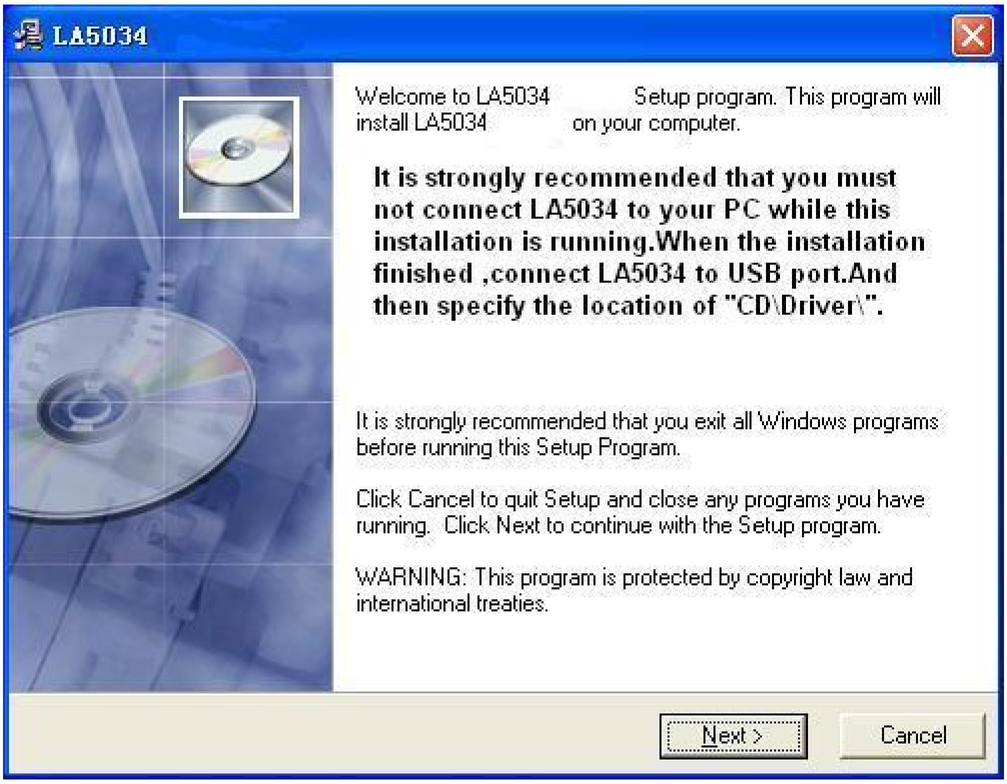
When the LED is illuminated but then turns off, the computer has lost the communication with the LA5034.To restore communication, disconnect the USB cable from the computer, and then reconnect it. This will restore communication, and the LED will turn on again.

Install Software

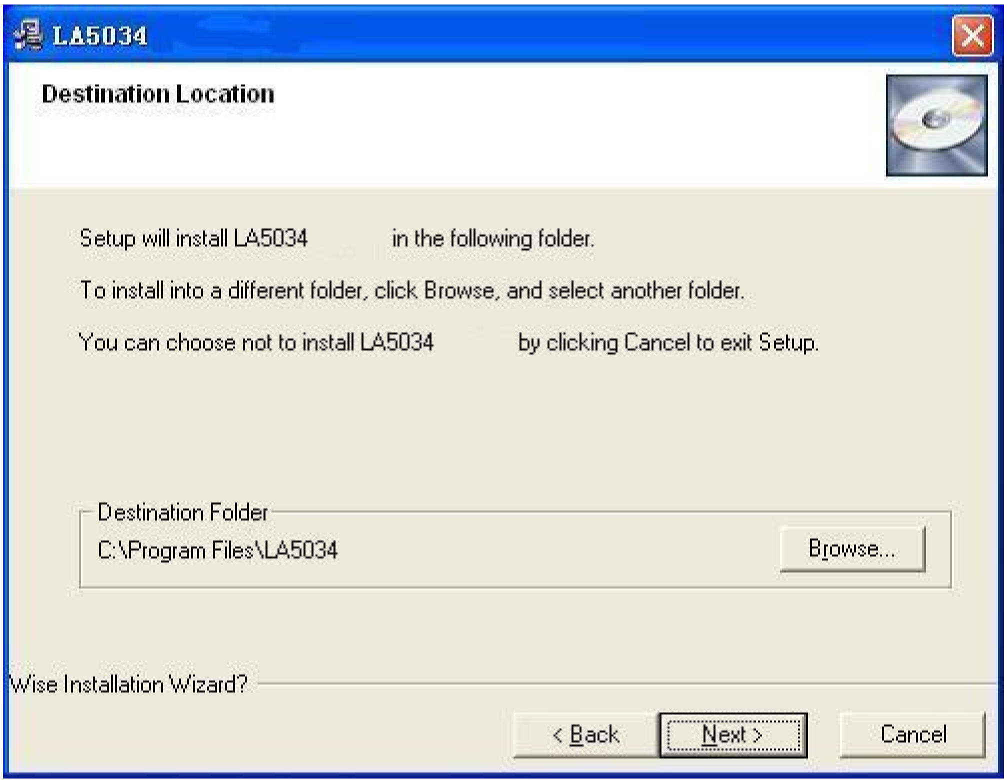
1. While in Windows, insert the installation CD into the CD-ROM drive.
2. The installation will start automatically. Otherwise in Windows Explorer, locate to the CD-ROM drive and run "Setup.exe".



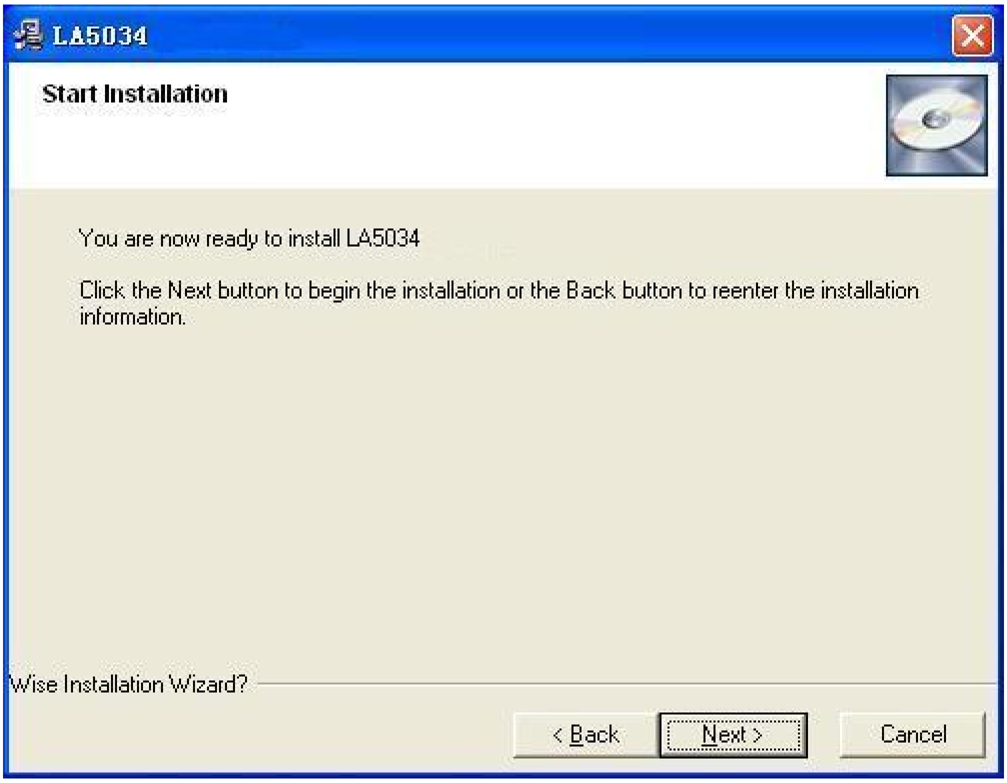
3. The LA5034 Installation is started. Click 'Next' to continue.



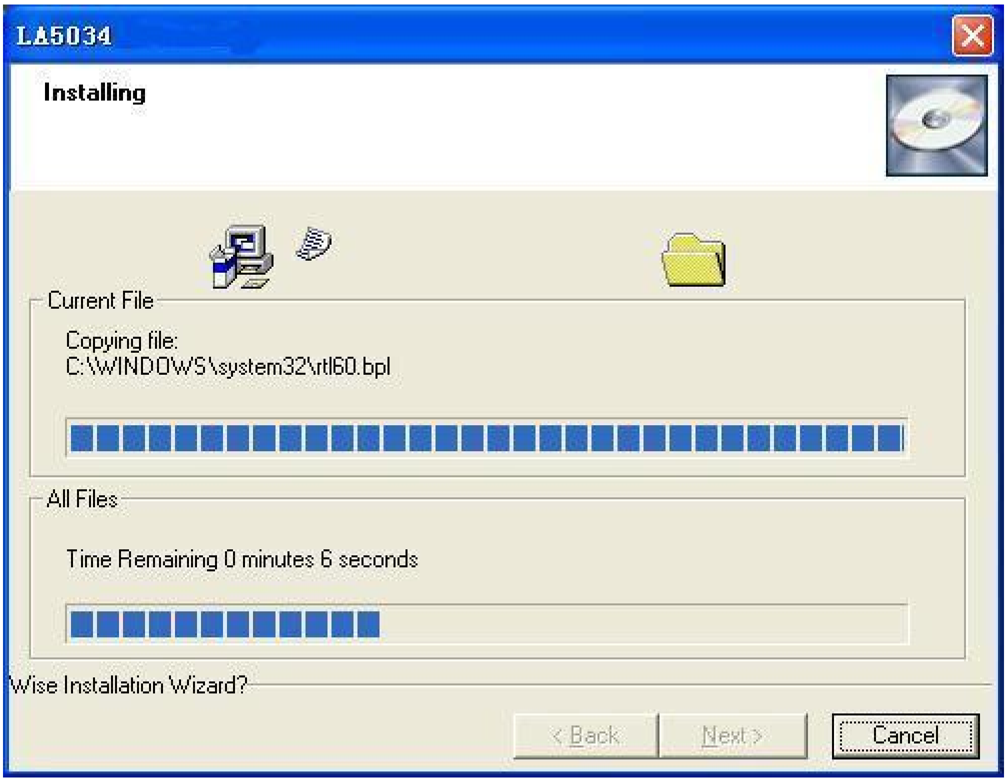
4. Choose a destination directory. Click 'Next' to continue.



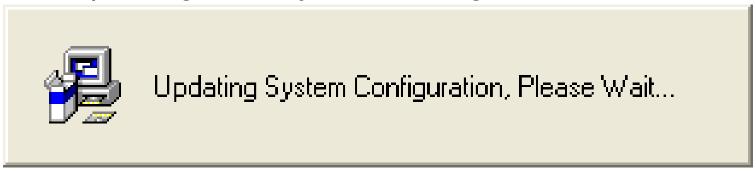
5. Check the setup information. Click Next to start copying of files.



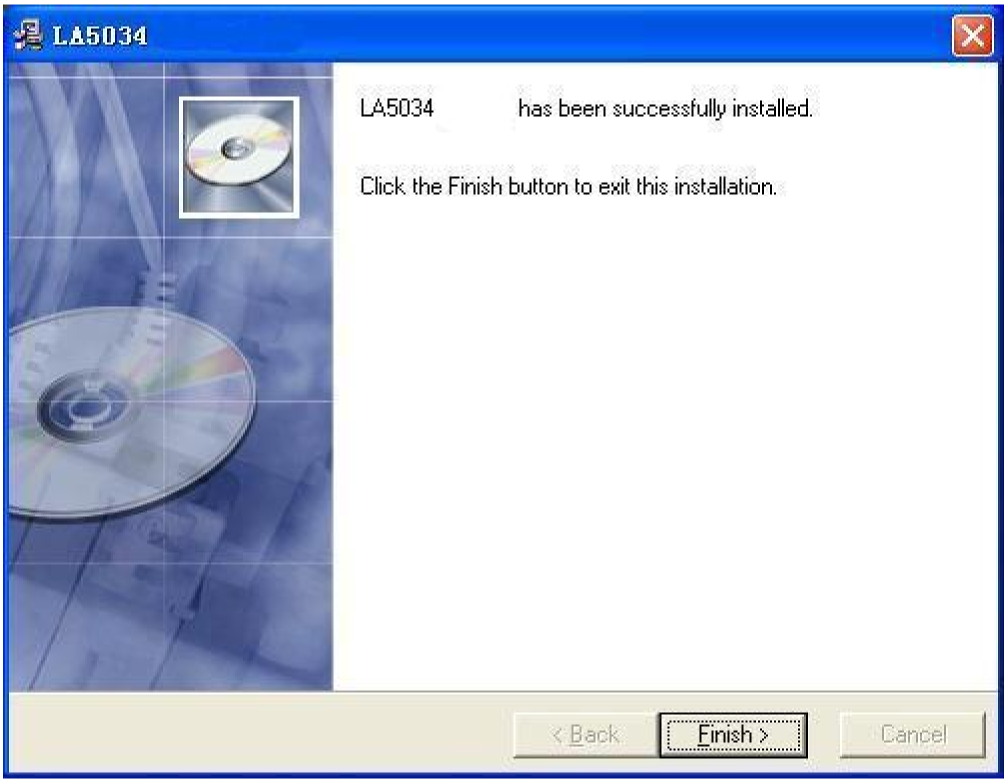
6. This Status dialog is displayed during copying the files.



7. Updating Your System Configuration.



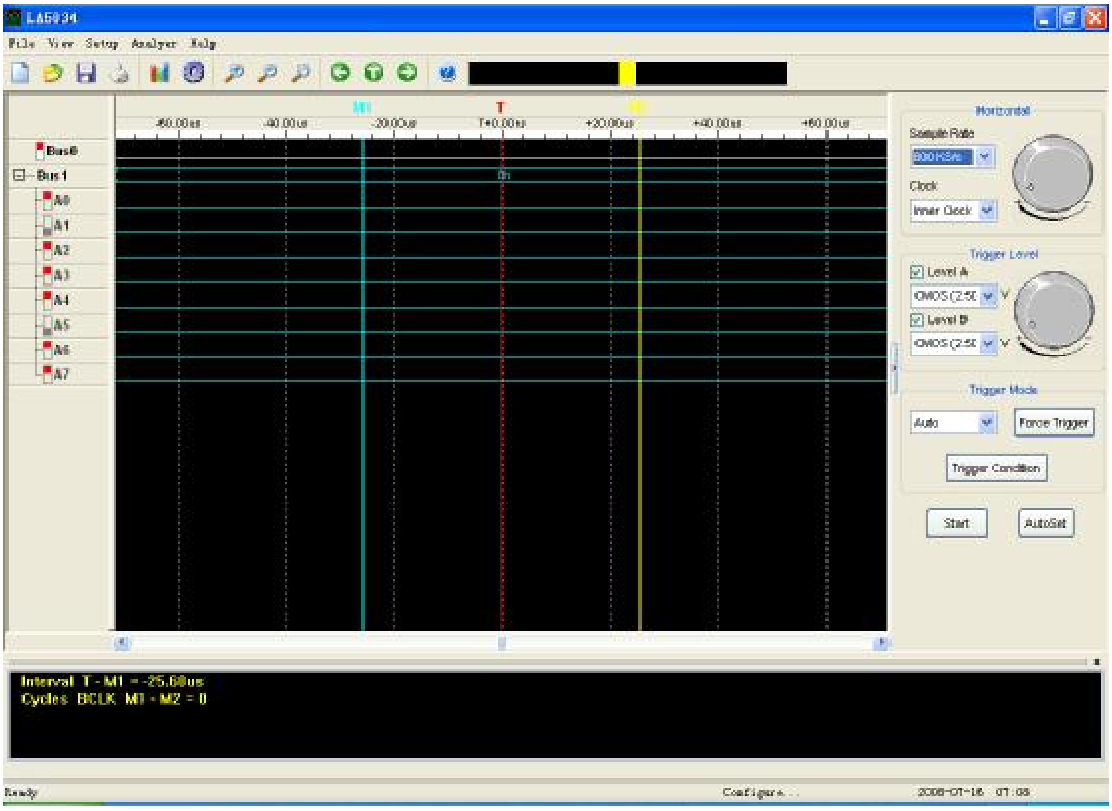
8. The installation is complete.


LA5034
LA5034 has been successfully installed.
Click the Finish button to exit this installation.
< Back
Finish >
Cancel

User Interface

LA5034 provides users with a simple and full-featured interface so that users do not have to spend a lot of time to learn the operation.

LA5034 provides clock panel, waveform panel, bus panel, measurement panel, trigger panel and plug-in manager.

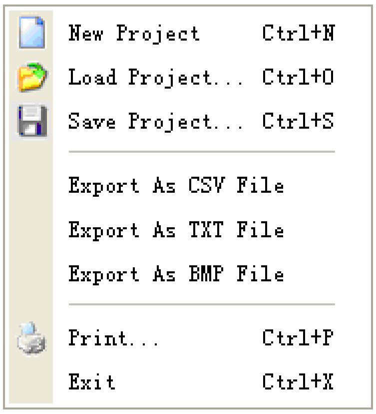


Chapter 2 Menu

This chapter focuses on the following topics:

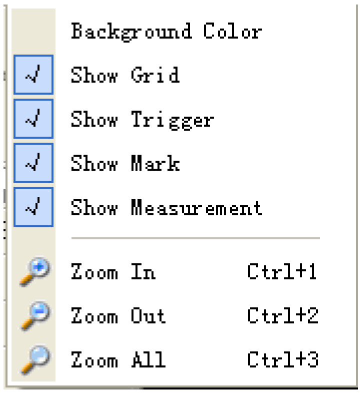
- File
- View
- Setup
- Analyzer
- Help

File



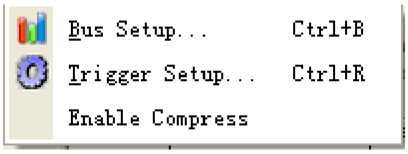
- **New Project**: Create a new project with default settings
- **Load Project:** Open an exist project
- **Save Project:** Save current project to File
- **Export As CSV File:** Export data to file as “CSV” format
- **Export As TXT File:** Export data to file as “TXT” format
- **Export As BMP File:** Export data to file as “BMP” format
- **Print:** Print the current waveform
- **Exit:** Exit LA5034 software

View



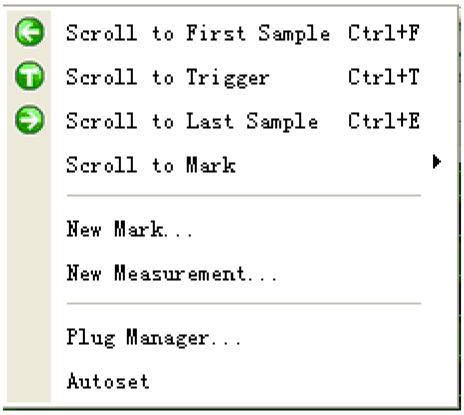
- **Background Color:** Modify the background color of waveform.
- **Show Grid:** Show or hide the grid of waveform
- **Show Trigger:** Show or hide the trigger position of waveform
- **Show Mark:** Show or hide the mark positions of waveform
- **Show Measurement:** Show or hide the measurement Panel of waveform
- **Zoom In:** Magnify waveforms
- **Zoom Out:** Reduce waveforms
- **Zoom All:** Show entire waveforms

Setup



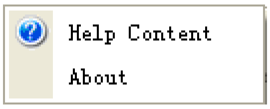
- **Signal Name Setup**: Name the signals
- **Bus Setup:** Configure the bus and its signals.
- **Trigger Setup:** Configure the trigger condition.
- **Enable Compress:** Set the compress as enabled or not.

Analyzer



- **Scroll to First Sample:** Make the waveform view to roll to the first sample position
- **Scroll to Trigger:** Make the waveform view to roll to trigger position.
- **Scroll to Last Sample:** Make the waveform view to roll to the last sample position
- **Scroll to Mark:** Make the waveform view to roll to the mark position
- **New Mark:** Create a new Mark
- **New Measurement:** Create a new measurement.
- **Plug-in Manager:** Configure the plug-in of LA5034
- **Auto set:** Set the waveform automatically to the best status.

Help



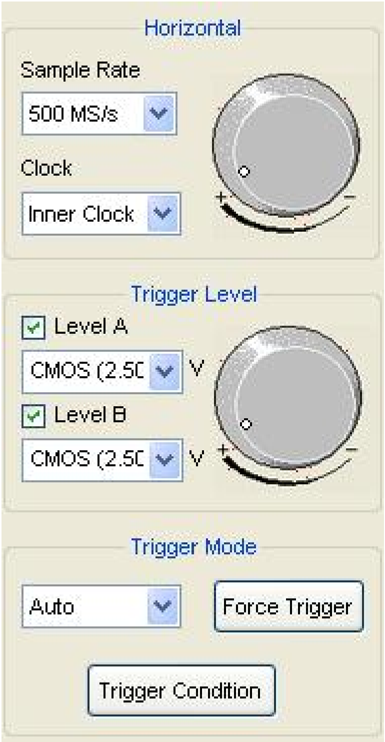
- **Help Content:** Open the User Manual
- **About:** Show the copyright of LA5034

Chapter 3 Advanced

This chapter focuses on the following topics:

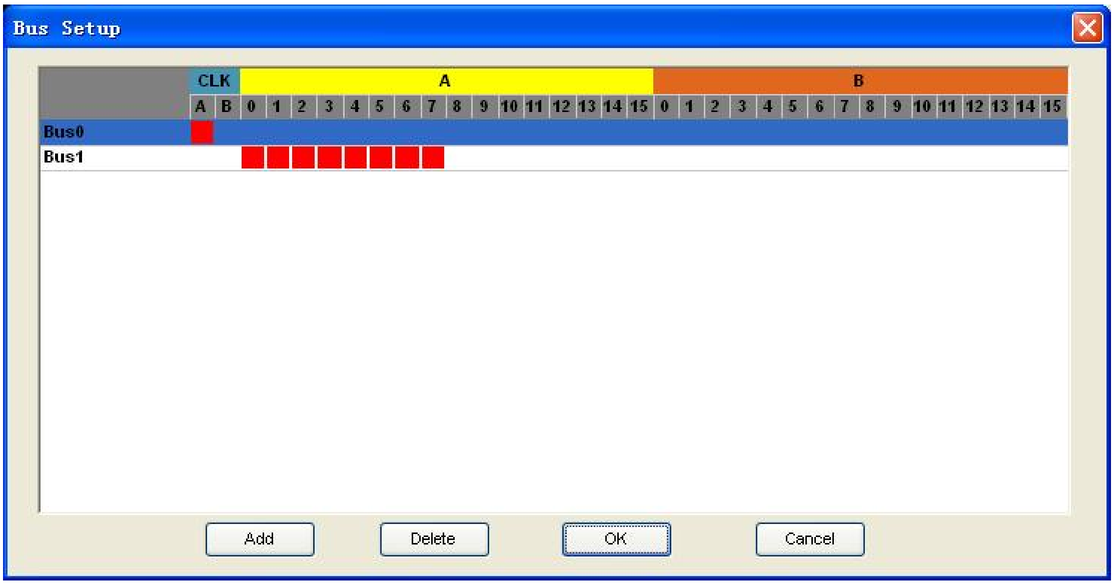
- Clock Panel
- Bus Panel
- Waveform Panel
- Measurement Panel
- Export Data

Clock Panel



- **Horizontal:**
  Set the clock and sample rate
  Inner Clock: When inner clock is chosen, the LA5034 will sample at a rate specified in the "Sample Rate" combo box.
  Ext Clock: When ext clock is chosen, you can select which clock input will be used for sampling.
- **Trigger Level:**
  Configure the input trigger level.
- **Trigger Mode:**
  Auto: Trigger continuously without the trigger condition.
  Normal: Trigger continuously under the trigger condition.
  Single: Trigger under the trigger condition once.
  Force Trigger: Trigger immediately once.
  Trigger Condition: Popup the trigger setup dialog.

Bus Panel



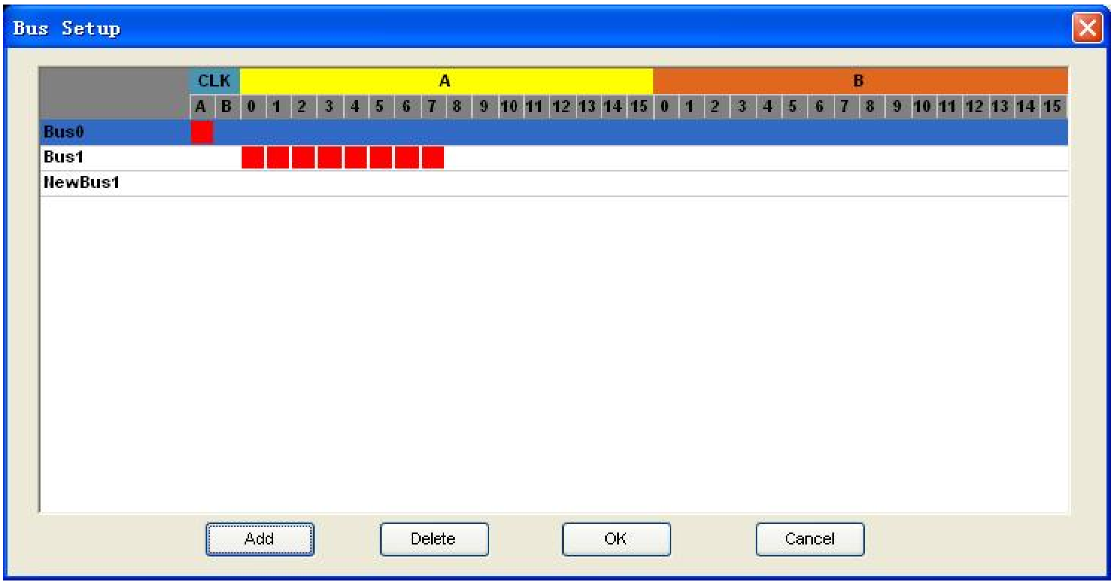
Click the menu “Setup”->”Bus Setup…” to open the dialog.

LA5034 has 34 signals, ACK, BCLK, A0 ~A15, B0~B15. You can assign parts of them to a bus.

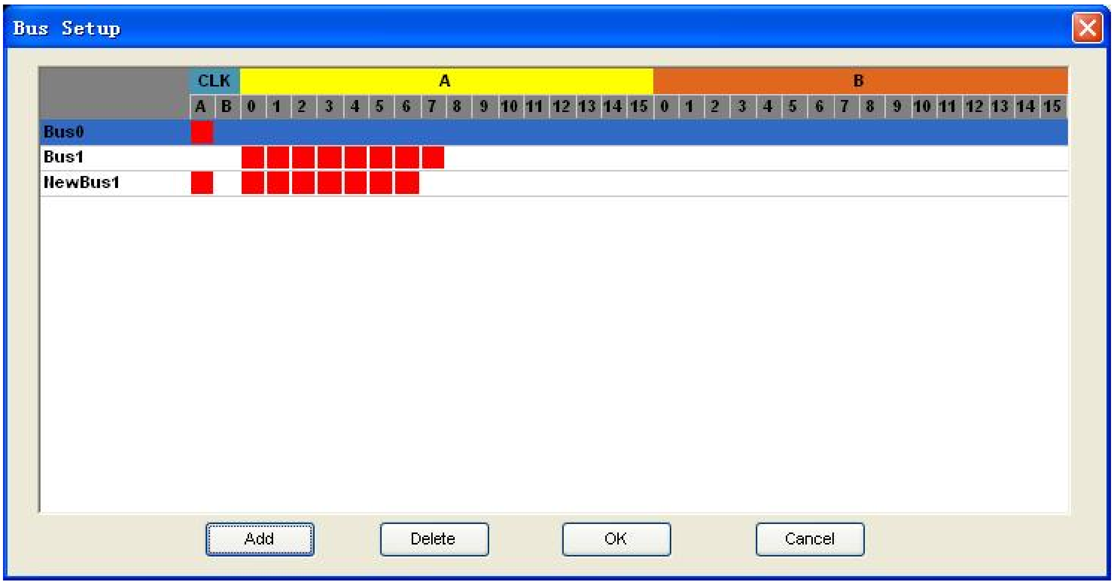
The list box contains all of the buses; you can add or delete the buses.

For example: Assign a bus “My Bus” which has 8 signals “ACLK, A0, A1, A2, A3, A4, A5, and A6 “.

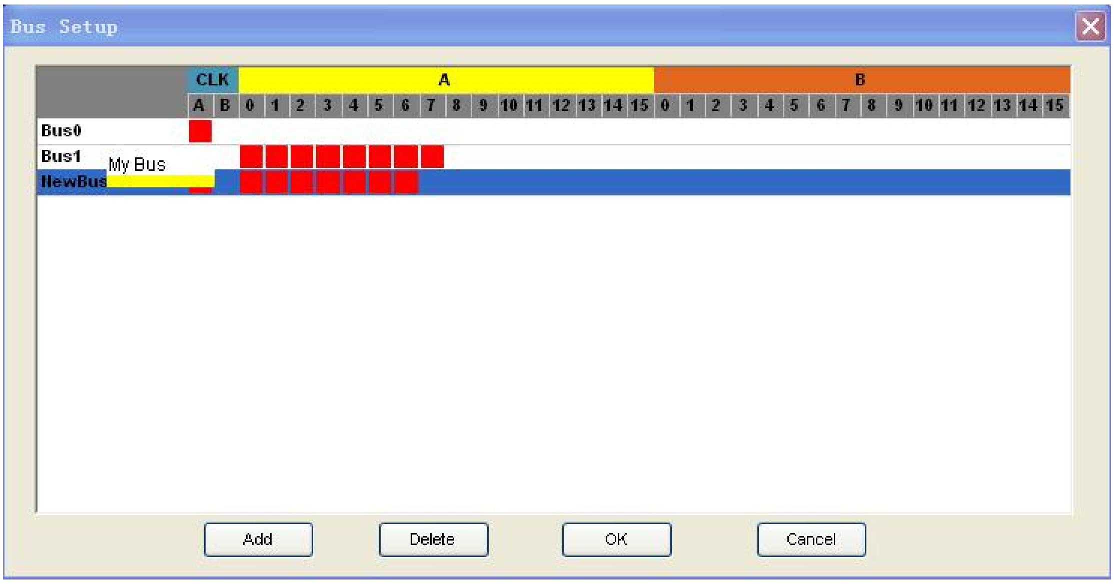
1. Click the button “Add”. Then a new bus is added to the list.



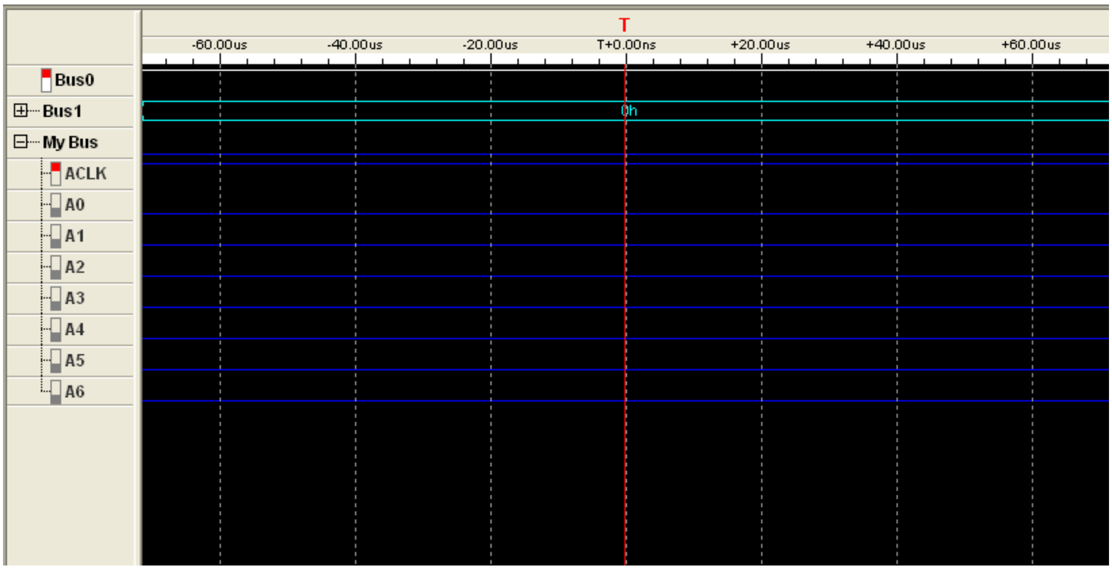
2. Click the panes under the CLKA, A0, A1, A2, A3, A4, A5, and A6. If the pane is red, it means that you have added the signals to the bus.



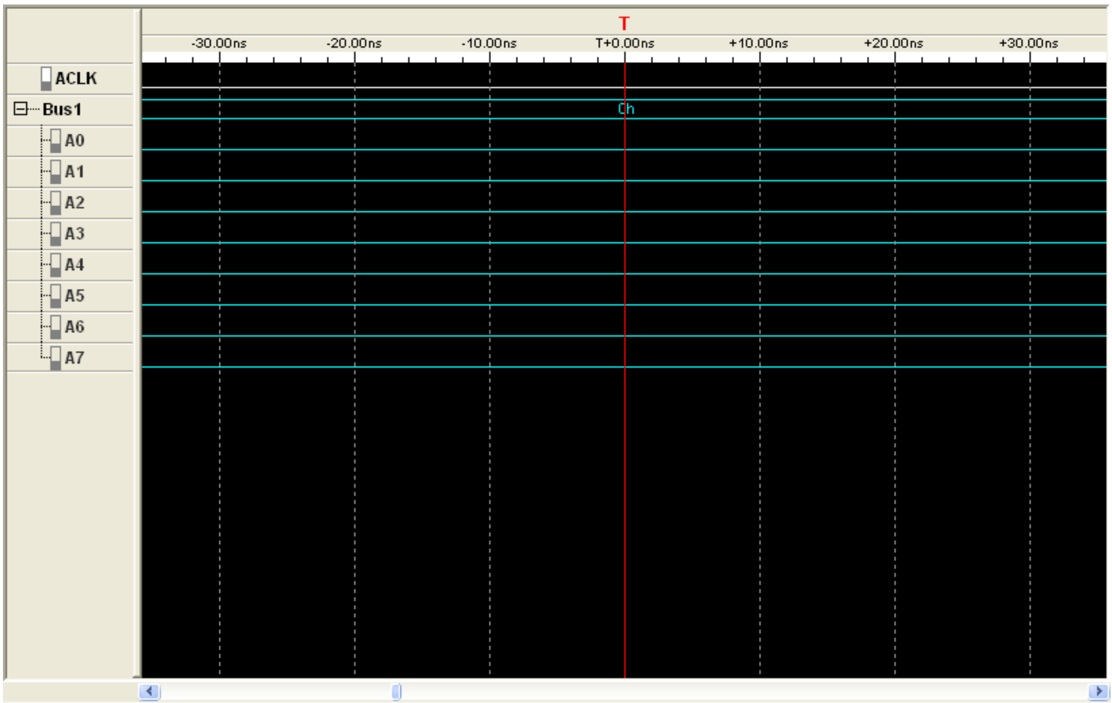
3. Double-click the name of the bus, which is “NewBus1” in this example. Then an edit box pops up, in which you can input the name “My Bus”.



4. Then Click “OK”, the new bus “My bus” has been added to the waveform.

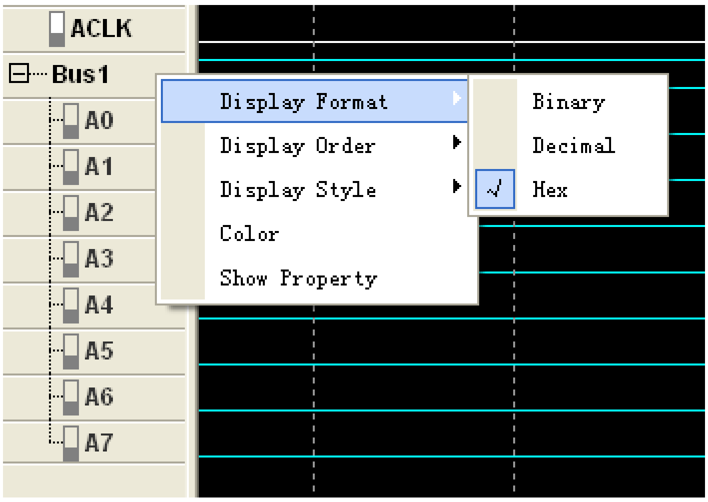

T
-60.00us
-40.00us
-20.00us
T+0.00ns
+20.00us
+40.00us
+60.00us
Bus0
Bus1
My Bus
ACLK
A0
A1
A2
A3
A4
A5
A6
0h

Waveform Panel



You can observe the waveform by the waveform panel in the main window. The list contains all of the buses in bus panel in the left part of the waveform panel.

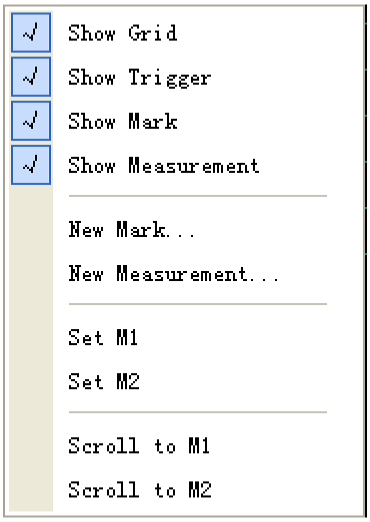
Click the name of the bus with the right mouse button, you can configure the bus.



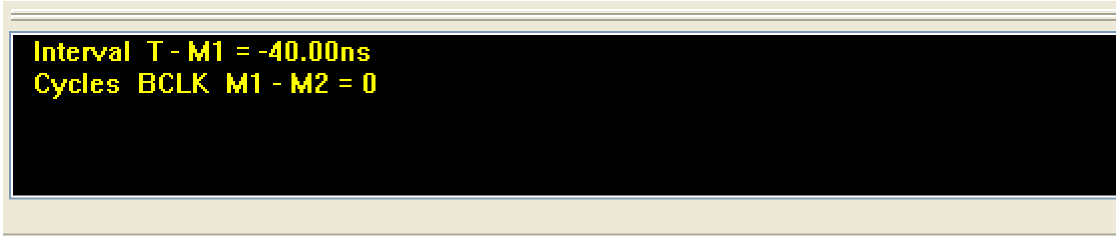
1. **Display Format:** The format of the bus data displayed on the waveform.
2. **Display Order:** The order of the signals displayed in the list.
3. **Display Style:** You can set the display style of the bus in the waveform, Analog or Digital.
4. **Color:** You can modify the color of the bus displayed in the waveform.

5. **Show Property:** Open the bus setup panel.

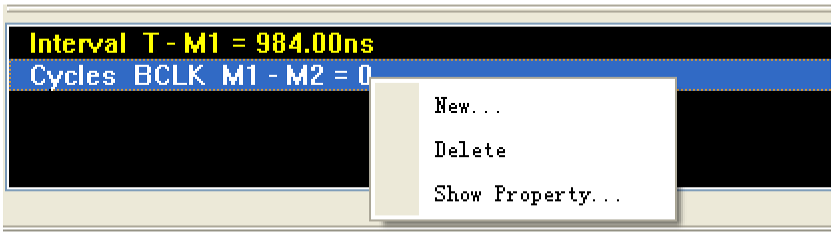
Click on the waveform with the right mouse button, the waveform operation menu pops up. You can operate on the waveforms by the menu.



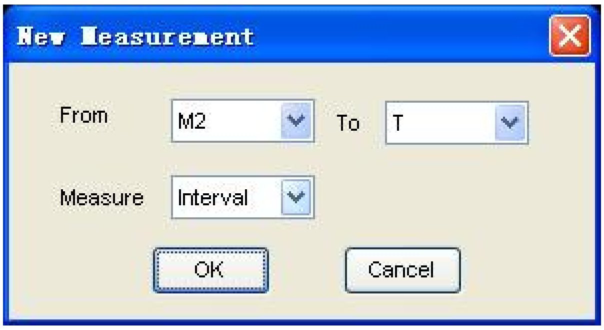
Measurement Panel



Click the measurement panel with the right mouse button, and then the menu pops up.



Click the "New" in this menu or "Analyzer"->"New Measurement" in the main menu, you will add a new measurement to the list in the measurement panel.



Select the "Measure" combo box. You can modify the types of measurement. There are 4 types for you: Interval, rate, transitions and cycles.

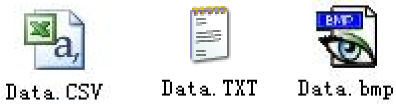
Click the "Delete"; you can delete the measurement item selected in the list. Click the "Show Property"; you can modify the setup of the corresponding measurement.

Also, you can click the main menu "Analyzer"->"New Mark" to add new mark for measurement.

Export Data

Export As CSV File
Export As TXT File
Export As BMP File

Click the menu “File”; you can export the data to file.



If you select the CSV file, you will export the data as the followings format.

	A	B	C	D	E	F	G	H	I	J	K	
1	Sample Pe	Trigger S	CompressData									
2	500 MS/s	2048	FALSE									
3	Sample Nu	NewGroup1	ACLK	BCLK	A0	B0	A1	B1	A2	B2	NewGroup2	AC
4	0	ffh	1	1	1	1	1	1	1	1	11h	
5	1	ffh	1	1	1	1	1	1	1	1	11h	
6	2	ffh	1	1	1	1	1	1	1	1	11h	
7	3	ffh	1	1	1	1	1	1	1	1	11h	
8	4	ffh	1	1	1	1	1	1	1	1	11h	
9	5	ffh	1	1	1	1	1	1	1	1	11h	
10	6	ffh	1	1	1	1	1	1	1	1	11h	
11	7	ffh	1	1	1	1	1	1	1	1	11h	
12	8	ffh	1	1	1	1	1	1	1	1	11h	
13	9	ffh	1	1	1	1	1	1	1	1	11h	
14	10	ffh	1	1	1	1	1	1	1	1	11h	
15	11	ffh	1	1	1	1	1	1	1	1	11h	
16	12	ffh	1	1	1	1	1	1	1	1	11h	
17	13	ffh	1	1	1	1	1	1	1	1	11h	
18	14	ffh	1	1	1	1	1	1	1	1	11h	
19	15	ffh	1	1	1	1	1	1	1	1	11h	
20	16	ffh	1	1	1	1	1	1	1	1	11h	

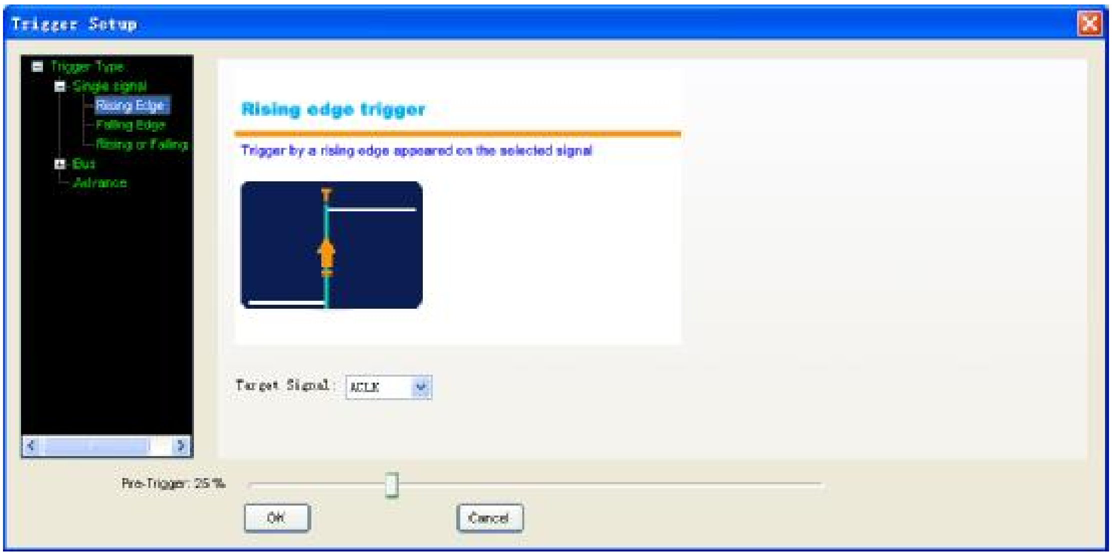
Chapter 4 Trigger

This chapter focuses on the following topics:

- Basic Trigger Setup
- Advanced Trigger Setup

Basic Trigger Setup

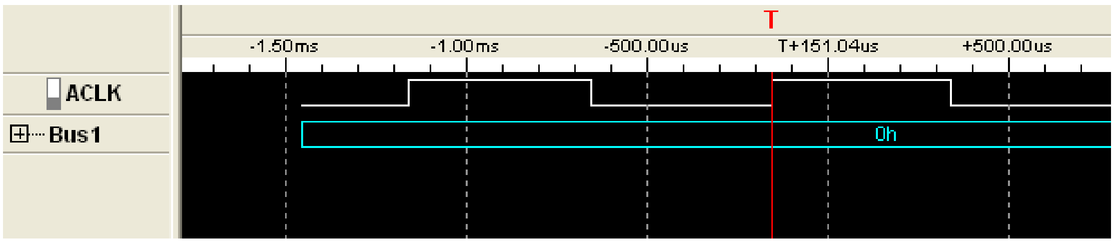
Click the menu “Setup”->”Trigger Setup”, you can configure the trigger condition.



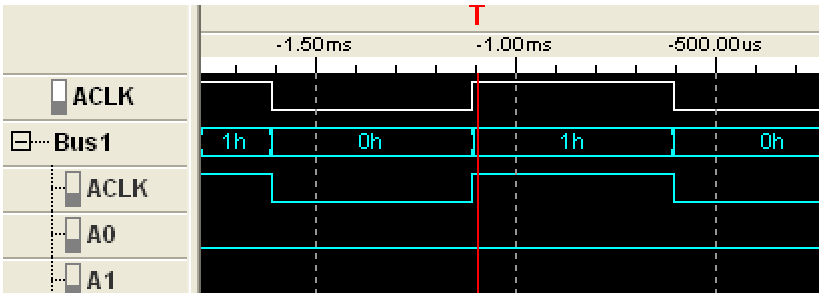
LA5034 provides 6 basic triggers for you.

- **Single signal**: Rising edge; Falling edge; Rising or falling edge.
- **Bus:** Data, Data value delay, Data and edge

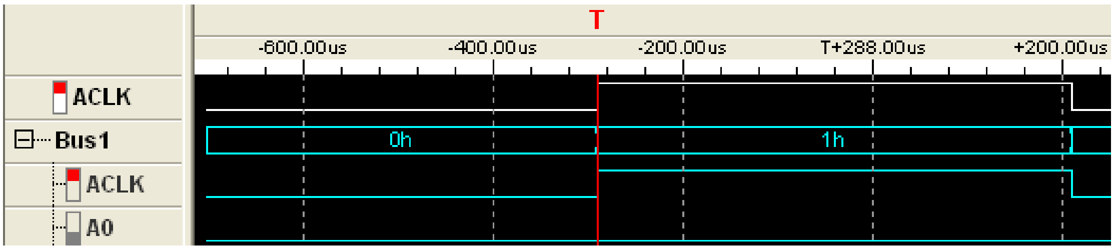
1. **Rising edge:**
   Select the “Rising edge” in the tree; select the signal in the combo box. Then it will be triggered by a rising edge appeared on the selected signal.



2. **Falling edge:**
   Trigger by a falling edge appeared on the selected signal.
3. **Rising or falling edge:**
   Trigger by a rising or falling edge appeared on the selected signal.
4. **Data:**
   Trigger at the appearance of a specified value on the selected bus.



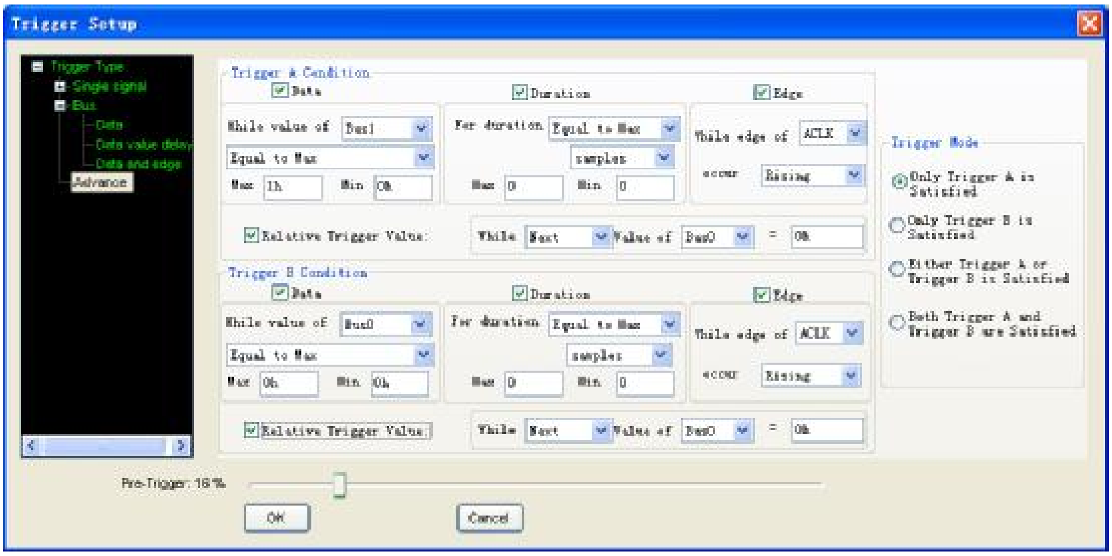
5. **Data value delay:**
   Trigger at some time or some samples after the appearance of a specified value
6. **Data and edge:**
   Trigger at the appearance of a specified value on the selected bus and the rising, falling, or rising or falling edge on the selected signal.



Advanced Trigger Setup

If the basic trigger can not meet your requirement, you need the advanced trigger setup.

Click the “Advance” in the tree, then you can configure the advanced trigger.



There are two trigger conditions: trigger A and trigger B. You can set the trigger mode by clicking the Trigger Mode group box.

There are four parts in each condition, Data, Duration, Edge and Relative trigger value.

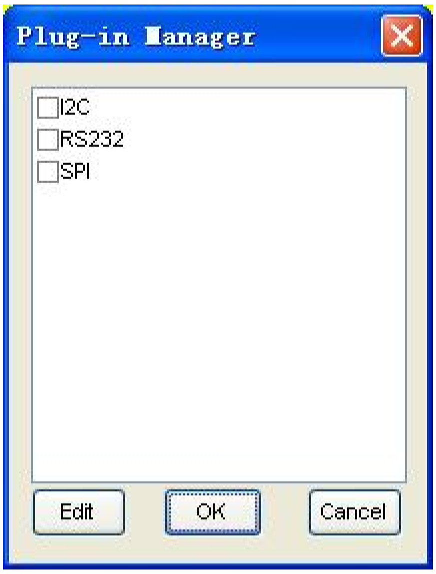
Chapter 5 Plug-in Manager

This chapter focuses on the following topics:

- Summary
- Example

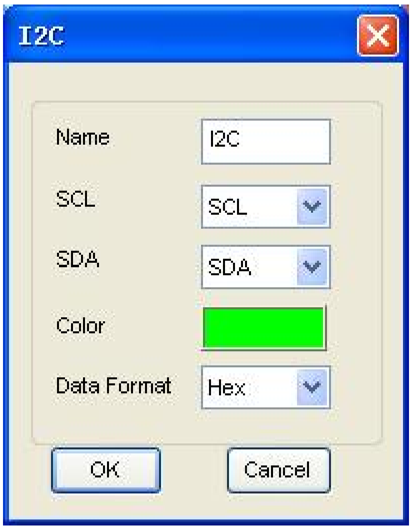
Summary

Click Menu “Analyzer”->”Plug-in Manager”.



The list box contains all of the plug-ins installed in your computer. You can add them to waveform by checking them.

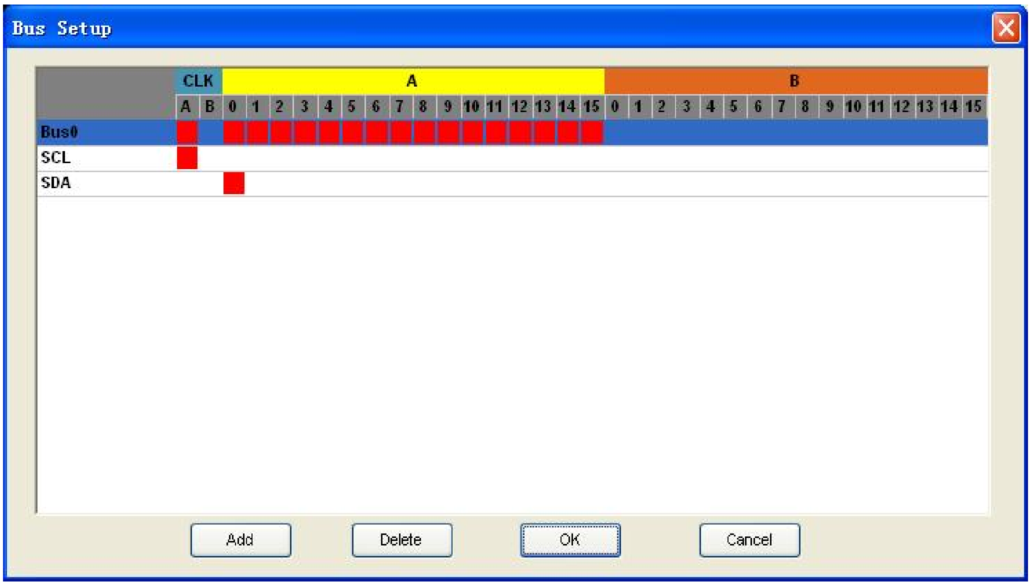
Select a plug-in and click the “Edit” button, you can set up the configurations of the plug-in.



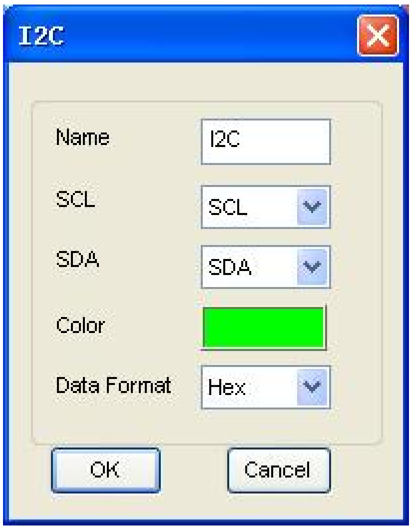
Example

If you want to analyze the I²C bus, you should go with the steps following.

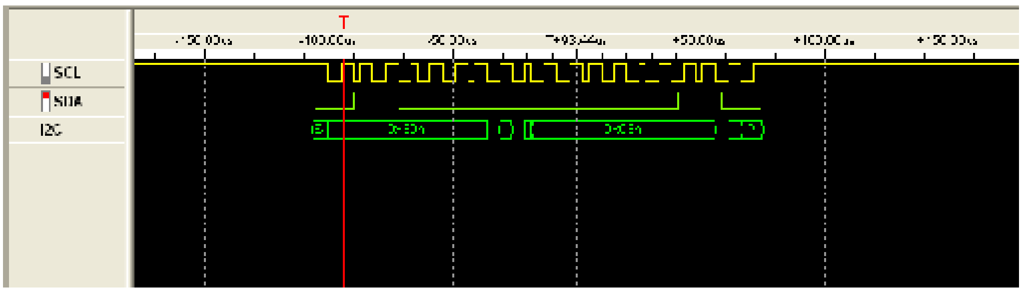
1. Click menu “Setup”->”Bus Setup” or toolbar , open the bus setup dialog. Then add two buses which only have one signal.



2. Open the plug-in manager and the I²C setup dialog. Click menu “Analyzer”->”Plug-in Manager”, then select I²C and click the “Edit” button.



3. Then you can see the following.



Appendix

- Hardware specification
- Input connector pin assignment
- Block Diagram
- Cleaning and Maintenance

Hardware Specification

Sampled channels	34
High input impedance	200K (C=10p)
Input voltage range	-60V~60V
Logic threshold Range	-6V~6V
Max Sample Rate	500 MHz
Max input Signal bandwidth	150 MHz
Min time resolution	2ns
Sample Depth	2KSample
Max record time （Compression mode）	10 hours
Max Sample Rate (Compression mode）	200 MHz
Trigger’s Max rate	250 MHz
Compatible input	TTL,LVTTL,CMOS,LVCOMS,ECL,PECL,EIA
Electrostatic Protected	15KV
Max input voltage	Max 250V 0.5s
Power	USB Port
Temperature range	-10℃~60℃

Channels

Level A

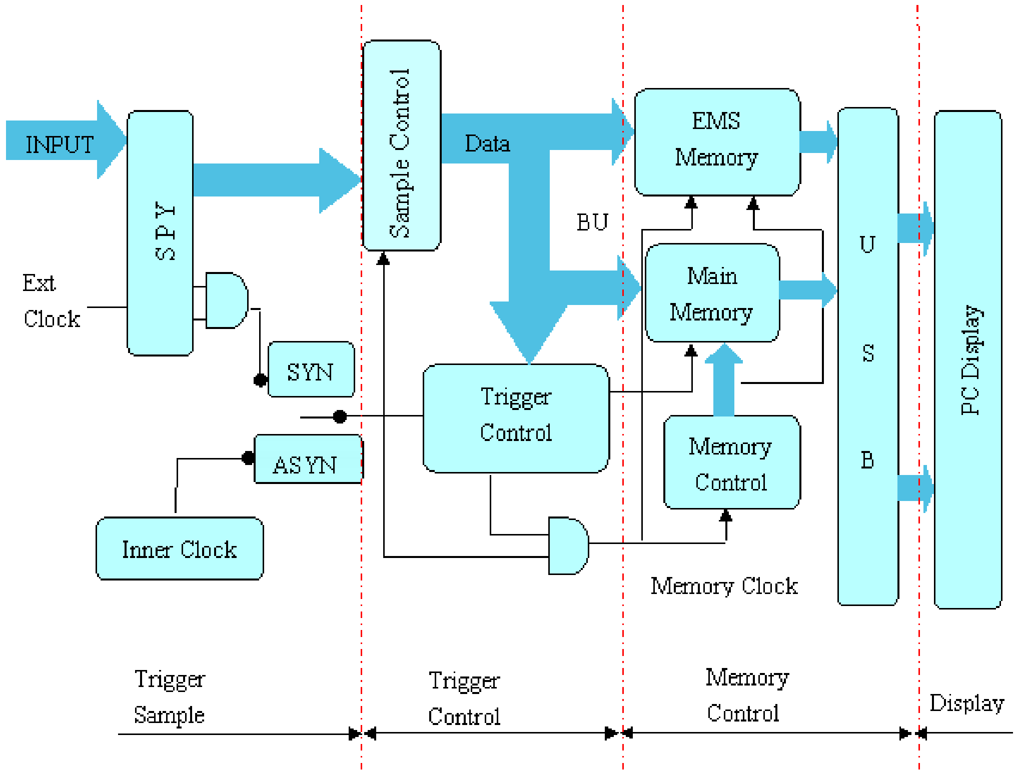
Pin Number	Wire ID	Wire Color	Contact Color
1	Ground	Black	Black
2	ACLK	Blue	Blue
3	Ground	Black	Black
4	A0	Black	Yellow
5	A1	White	Yellow
6	A2	Gray	Yellow
7	A3	Blue	Yellow
8	A4	Green	Yellow
9	A5	Yellow	Yellow
10	A6	Orange	Yellow
11	A7	Red	Yellow
12	A8	Black	Yellow
13	A9	White	Yellow
14	A10	Gray	Yellow
15	A11	Blue	Yellow
16	A12	Green	Yellow
17	A13	Yellow	Yellow
18	A14	Orange	Yellow
19	A15	Red	Yellow
20	Ground	Black	Black

Level B

Pin Number	Wire ID	Wire Color	Contact Color
1	Ground	Black	Black
2	BCLK	Blue	Blue
3	Ground	Black	Black
4	B0	Black	Orange
5	B1	White	Orange
6	B2	Gray	Orange
7	B3	Blue	Orange
8	B4	Green	Orange
9	B5	Yellow	Orange
10	B6	Orange	Orange
11	B7	Red	Orange
12	B8	Black	Orange
13	B9	White	Orange
14	B10	Gray	Orange

15	B11	Blue	Orange
16	B12	Green	Orange
17	B13	Yellow	Orange
18	B14	Orange	Orange
19	B15	Red	Orange
20	Ground	Black	Black

Block Diagram



Cleaning and maintenance

Cleaning

In order to keep the instrument clean, you need to check often whether the channels are dusty or not. Please clean the instrument surface and the channel connecting points as per the following cautions:

1. Use soft and uncottony cloth, such as velvet, to wipe the dust off the instrument surface and channel connection points.

2. Use wet but not water-dropping cloth to clean the instrument. Do not use any corrosive or chemical detergent.

Caution: Please make sure that the instrument is dry enough before power is on. Avoid short-circuit or even body damage caused by water!

Maintenance

Don’t put the instrument in sunshine for a long time. Put it in good ventilation environment.

Caution: In order not to not destroy the instrument, do not put it in fog, liquid or solvent.